

Figure 1

Physical DRAM # 0

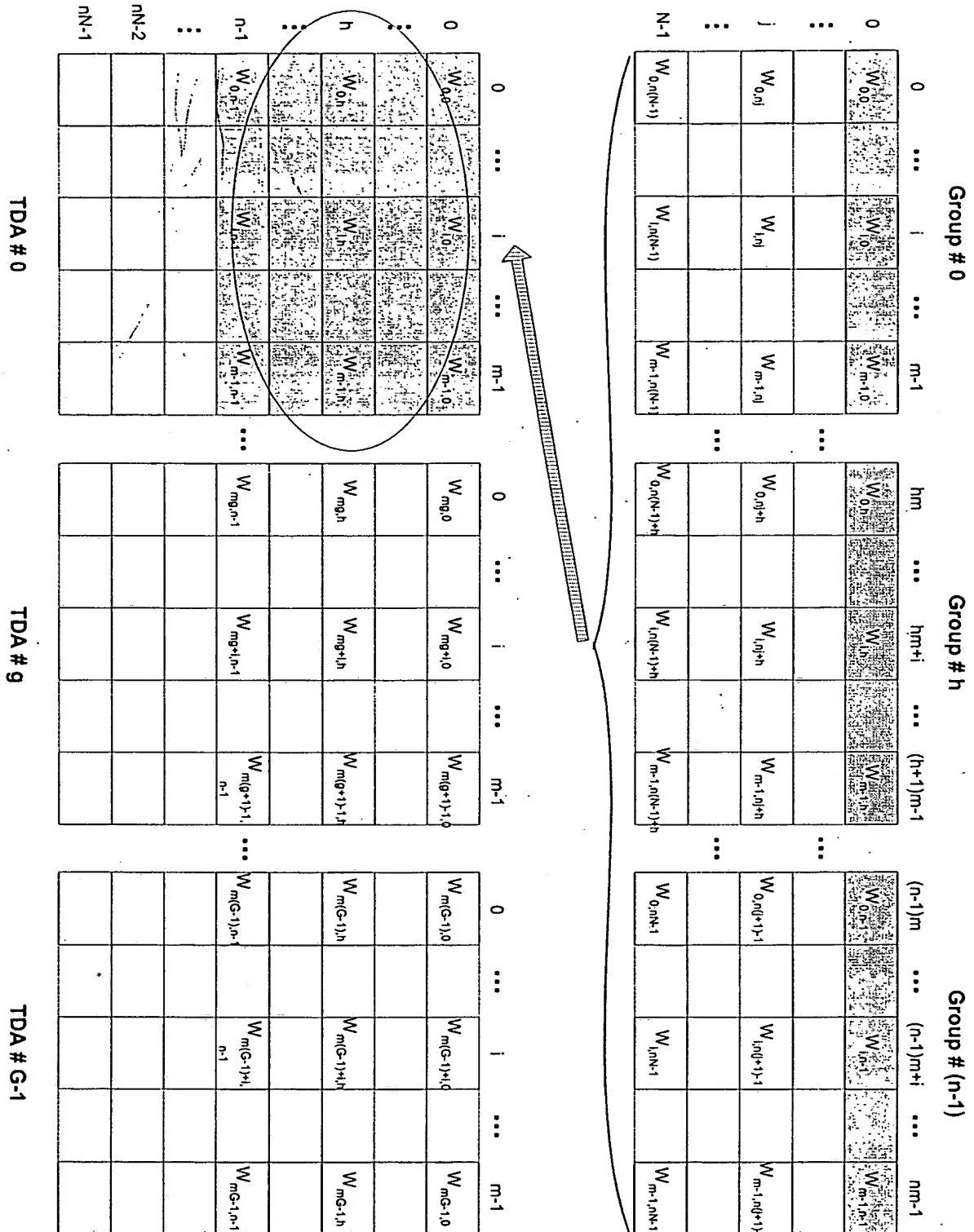


Figure 2

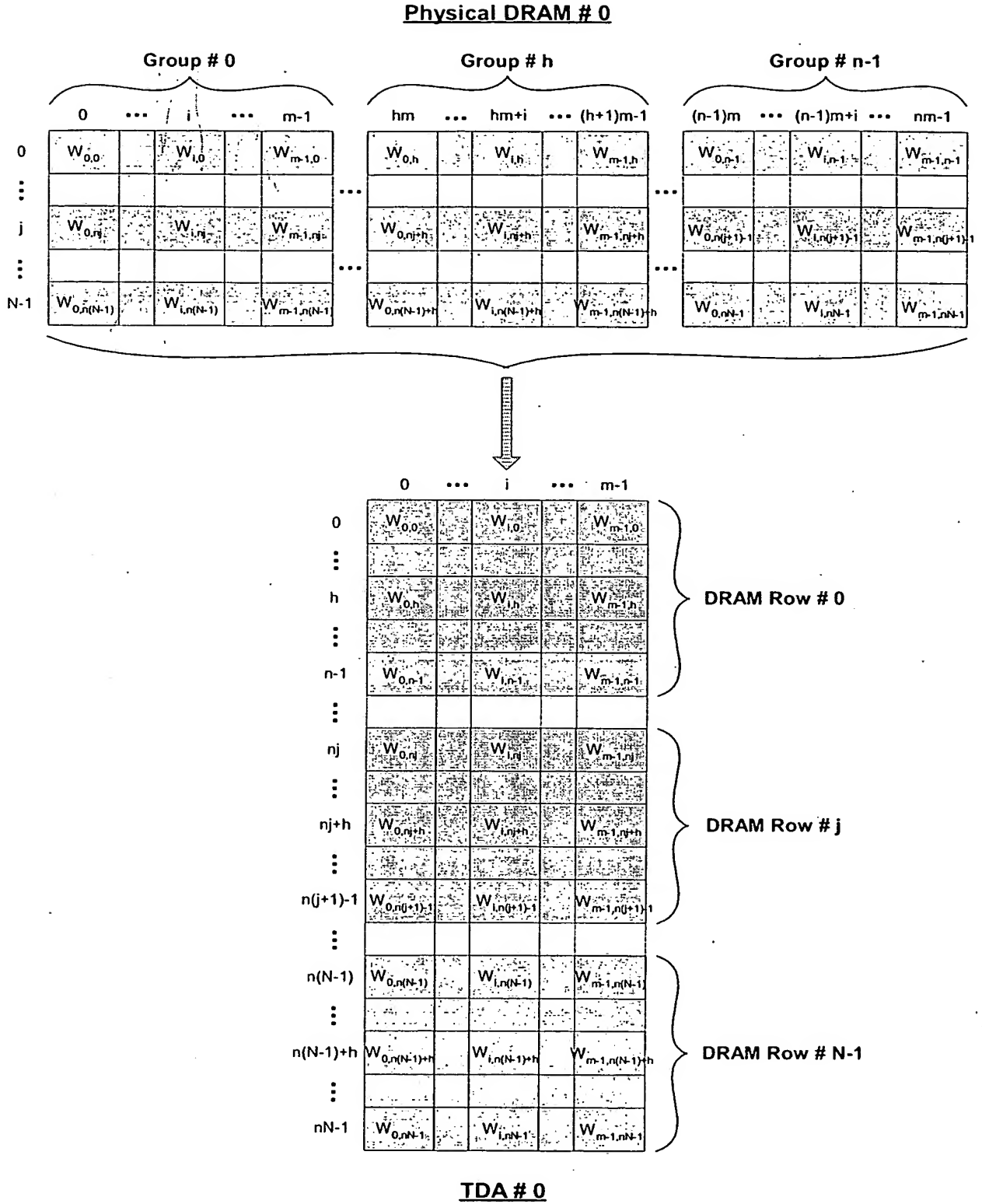


Figure 3

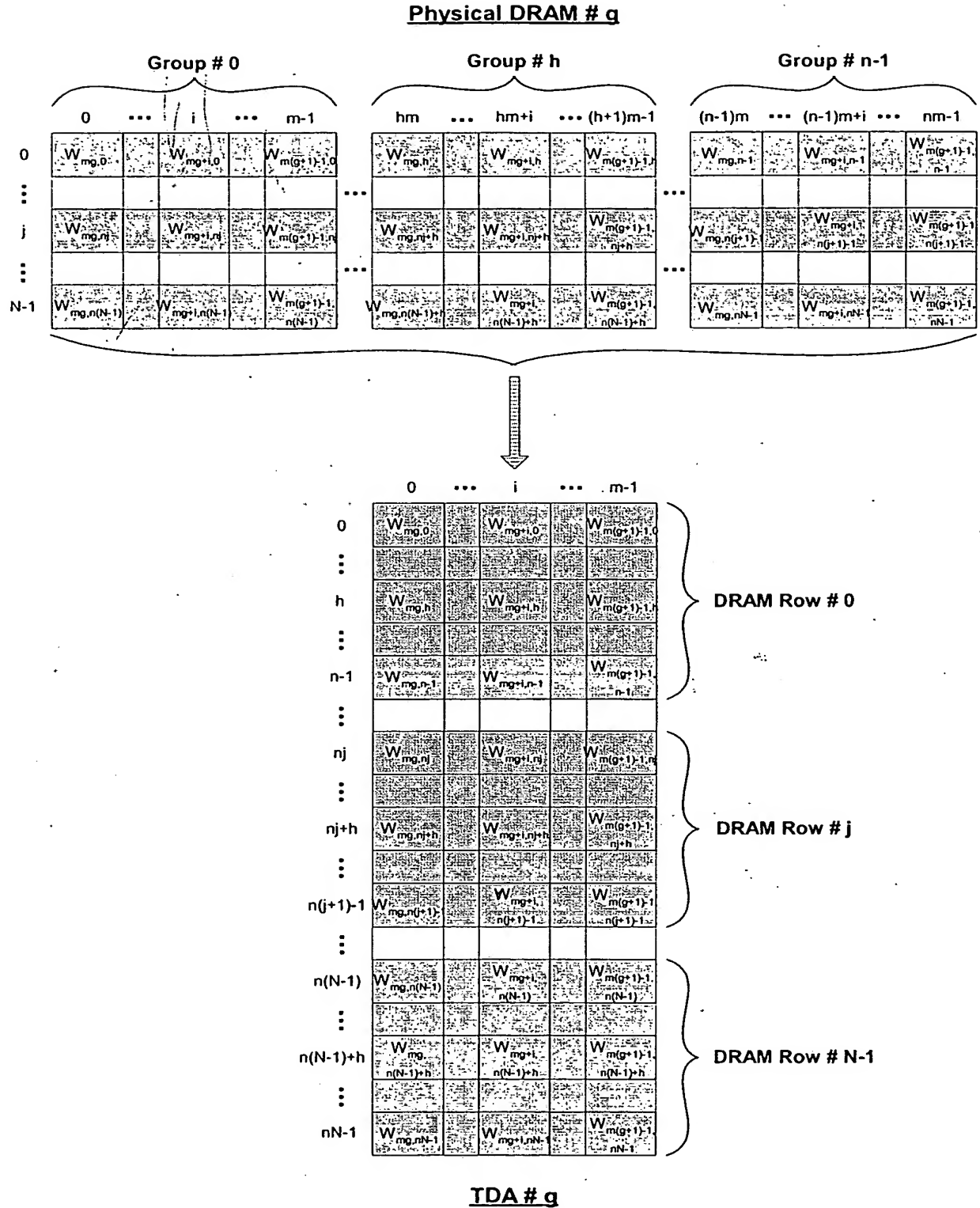
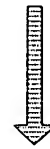
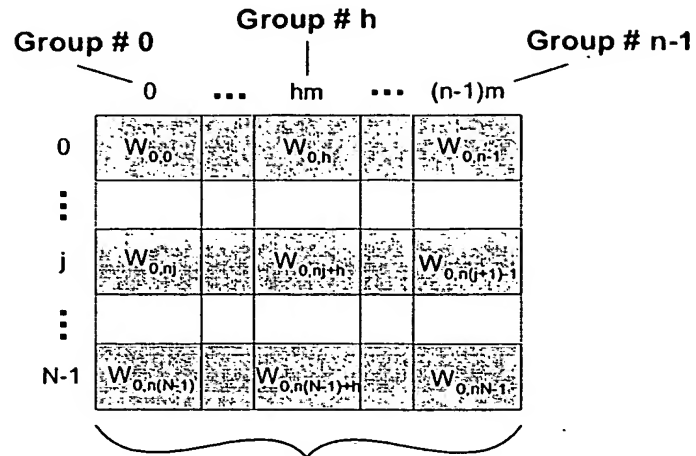


Figure 4

FC-Register for
Physical DRAM # 0



FC-Register for
TDA # 0

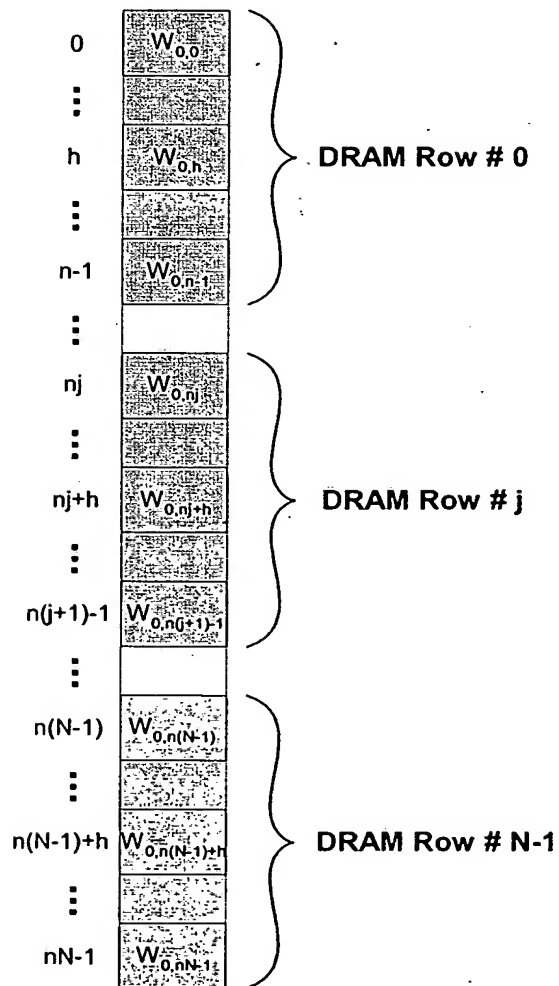


Figure 5

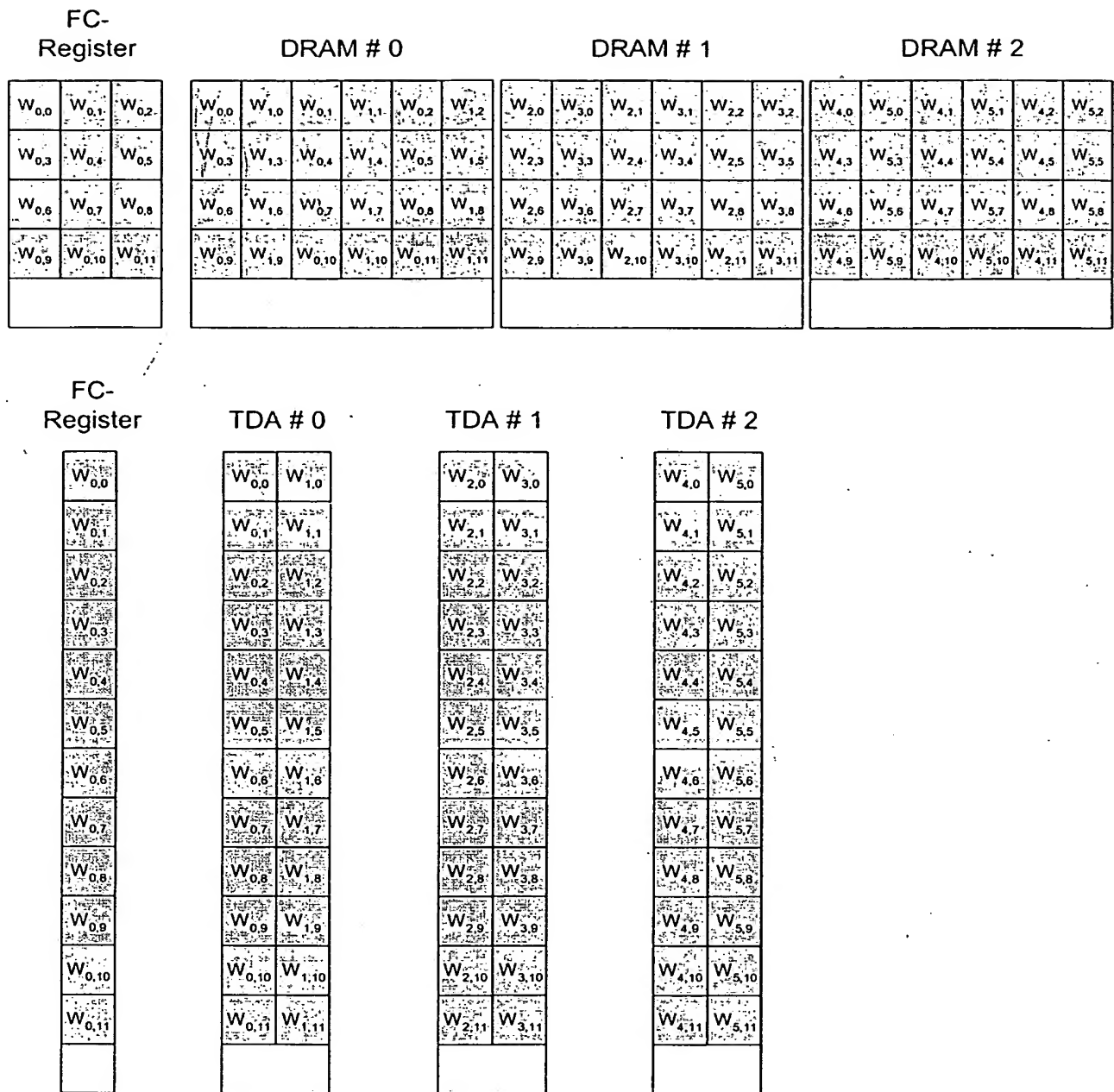


Figure 6

FC-Register			DRAM # 0						DRAM # 1						DRAM # 2					
$W_{0,0}$	$W_{0,1}$	$W_{0,2}$	$W_{0,0}$	$W_{1,0}$	$W_{0,1}$	$W_{1,1}$	$W_{0,2}$	$W_{1,2}$	$W_{2,0}$	$W_{3,0}$	$W_{2,1}$	$W_{3,1}$	$W_{2,2}$	$W_{3,2}$	$W_{4,0}$	$W_{5,0}$	$W_{4,1}$	$W_{5,1}$	$W_{4,2}$	$W_{5,2}$
0	12	24	0	2	12	14	24	26	4	6	16	18	28	30	8	10	20	22	32	34
36	48	60	36	38	48	50	60	62	40	42	52	54	64	66	44	46	56	58	68	70
72	84	96	72	74	84	86	96	98	76	78	88	90	100	102	80	82	92	94	104	106
108	120	132	108	110	120	122	132	134	112	114	124	126	136	138	116	118	128	130	140	142

FC-Register		TDA # 0		TDA # 1		TDA # 2	
$W_{0,0}$	$W_{0,1}$	$W_{0,0}$	$W_{1,0}$	$W_{2,0}$	$W_{3,0}$	$W_{4,0}$	$W_{5,0}$
0	12	0	2	4	6	8	10
24	36	12	14	16	18	20	22
48	60	24	26	28	30	32	34
72	84	36	38	40	42	44	46
96	108	48	50	52	54	56	58
120	132	60	62	64	66	68	70
		72	74	76	78	80	82
		84	86	88	90	92	94
		96	98	100	102	104	106
		108	110	112	114	116	118
		120	122	124	126	128	130
		132	134	136	138	140	142

Figure 7

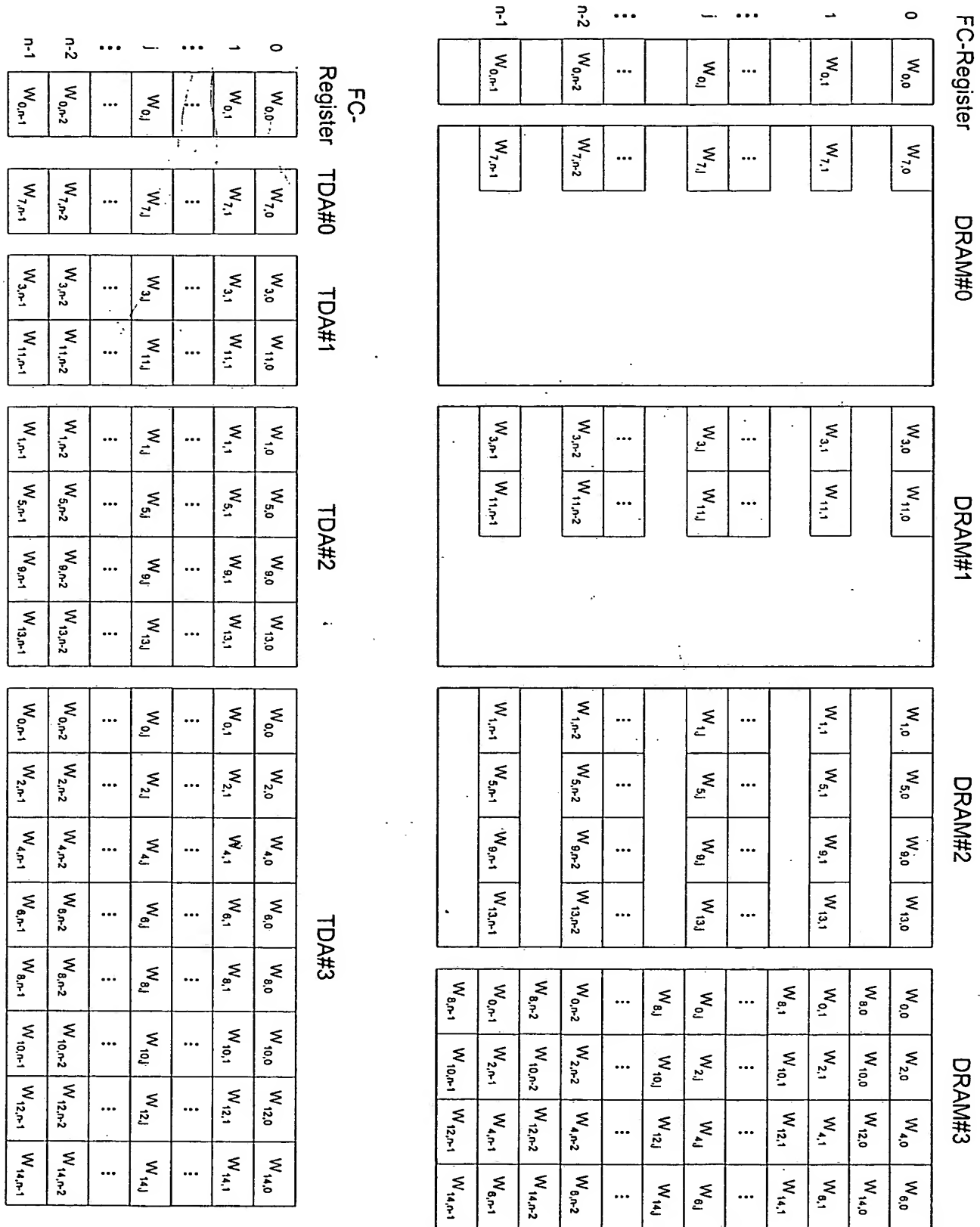


Figure 8

Storage procedure for Binary Search - the entries involved in each stage are stored in separate TDAs

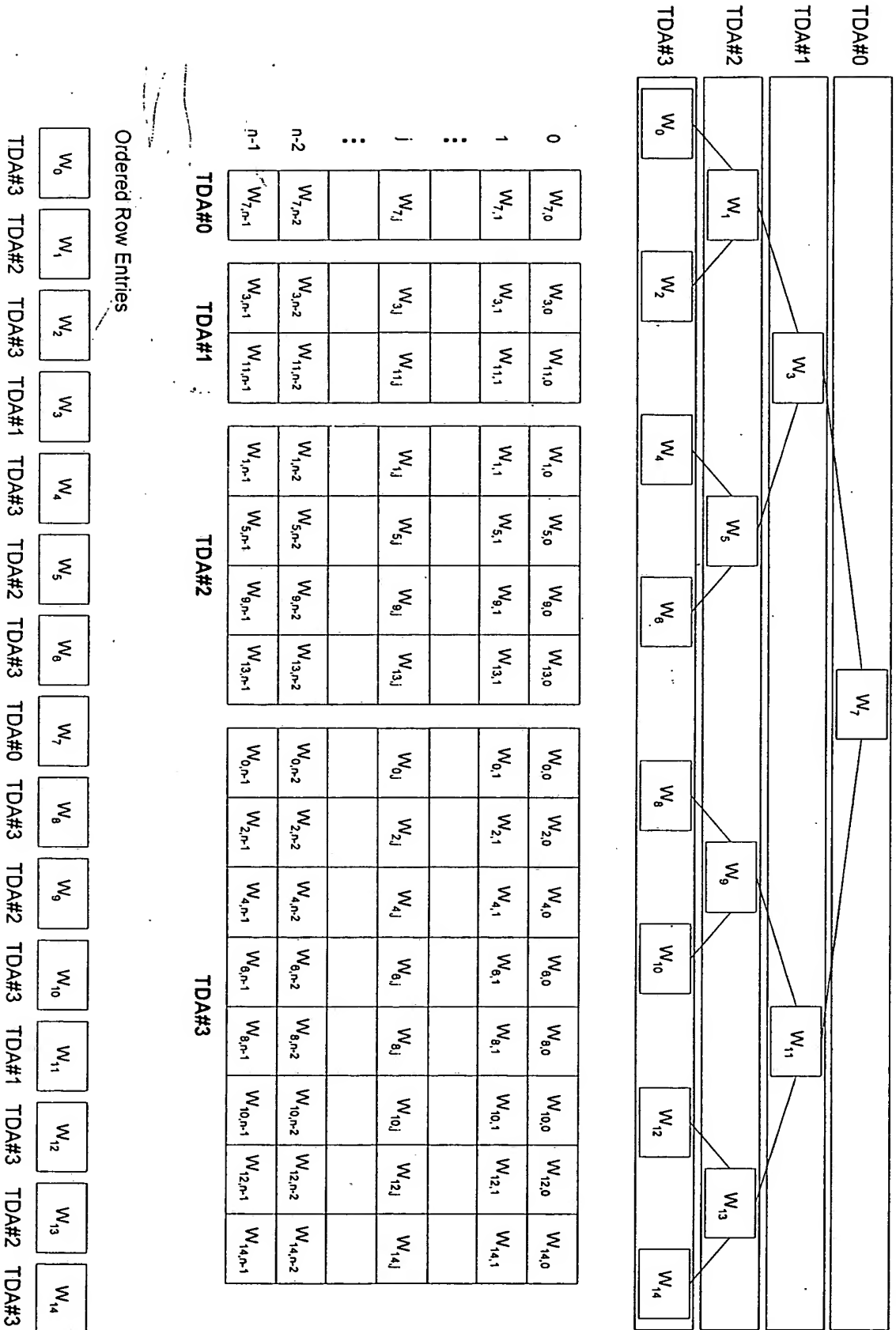


Figure 9

FC-Register		DRAM # 0		DRAM # 1		DRAM # 2				DRAM # 3			
		W _{7,0}		W _{3,0}	W _{11,0}	W _{1,0}	W _{5,0}	W _{9,0}	W _{13,0}	W _{0,0}	W _{2,0}	W _{4,0}	W _{6,0}
W _{0,0}	0	14		6	22	2	10	18	26	0	4	8	12
W _{8,0}	16									16	20	24	28
W _{0,1}	30	44		36	52	32	40	48	56	30	34	38	42
W _{8,1}	46									46	50	54	58
W _{0,2}	60	74		66	82	62	70	78	86	60	64	68	72
W _{8,2}	76									76	80	84	88
W _{0,3}	90	104		96	112	92	100	108	116	90	94	98	102
W _{8,3}	106									106	110	114	118
W _{0,4}	120	134		126	142	122	130	138	146	120	124	128	132
W _{8,4}	136									136	140	144	148

FC-Register		TDA # 0		TDA # 1		TDA # 2				TDA # 3							
		W _{7,0}		W _{3,0}	W _{11,0}	W _{1,0}	W _{5,0}	W _{9,0}	W _{13,0}	W _{0,0}	W _{2,0}	W _{4,0}	W _{6,0}	W _{8,0}	W _{10,0}	W _{12,0}	W _{14,0}
W _{0,0}	0	14		6	22	2	10	18	26	0	4	8	12	16	20	24	28
W _{0,1}	30	44		36	52	32	40	48	56	30	34	38	42	46	50	54	58
W _{0,2}	60	74		66	82	62	70	78	86	60	64	68	72	76	80	84	88
W _{0,3}	90	104		96	112	92	100	108	116	90	94	98	102	106	110	114	118
W _{0,4}	120	134		126	142	122	130	138	146	120	124	128	132	136	140	144	148

Figure 10

Storage procedure for Binary Search - the entries involved in each stage are stored in separate TDAs

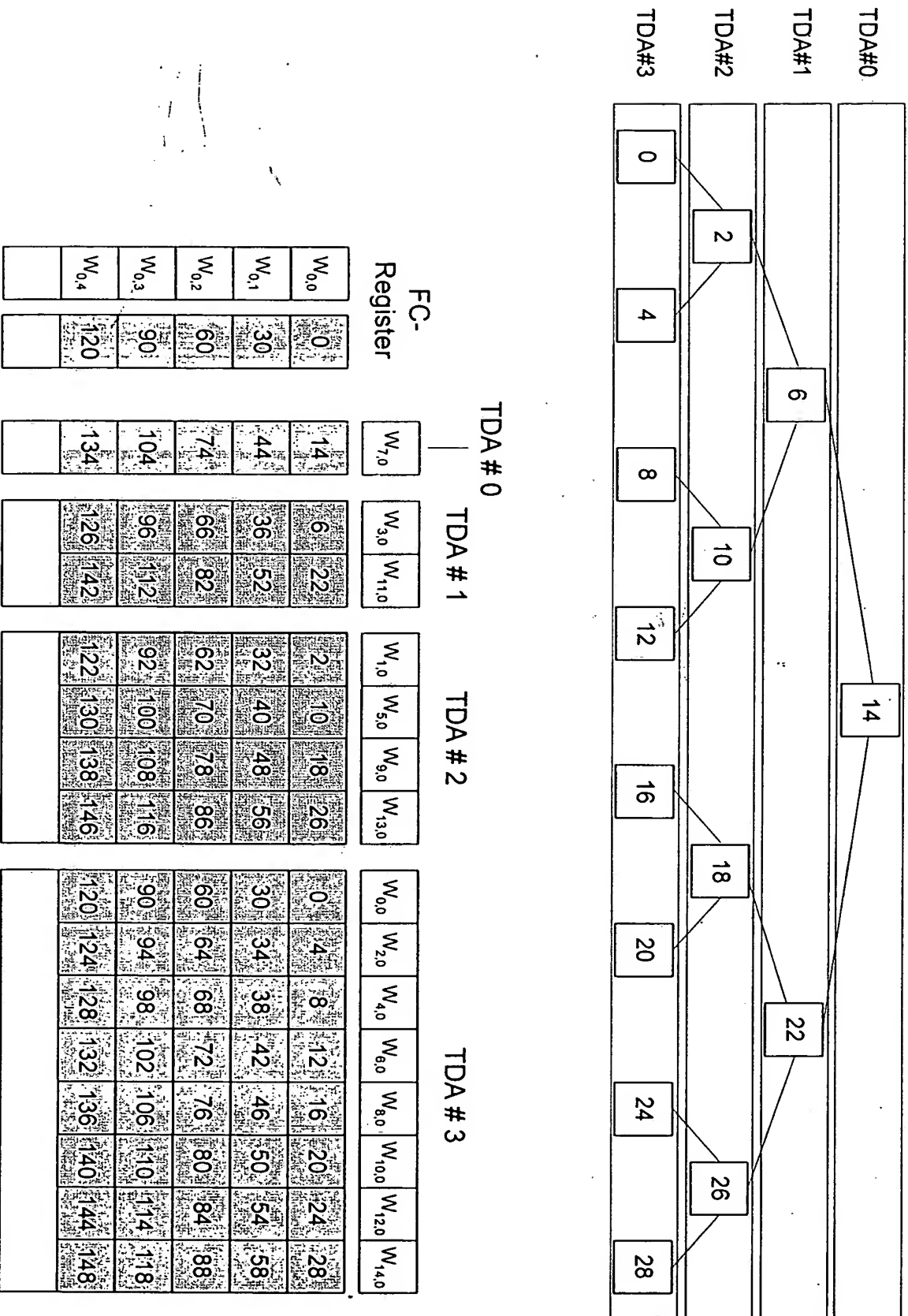


Figure 11

Storage procedure for Binary Search followed by Linear Search - the entries involved in each stage are stored in separate RAMs

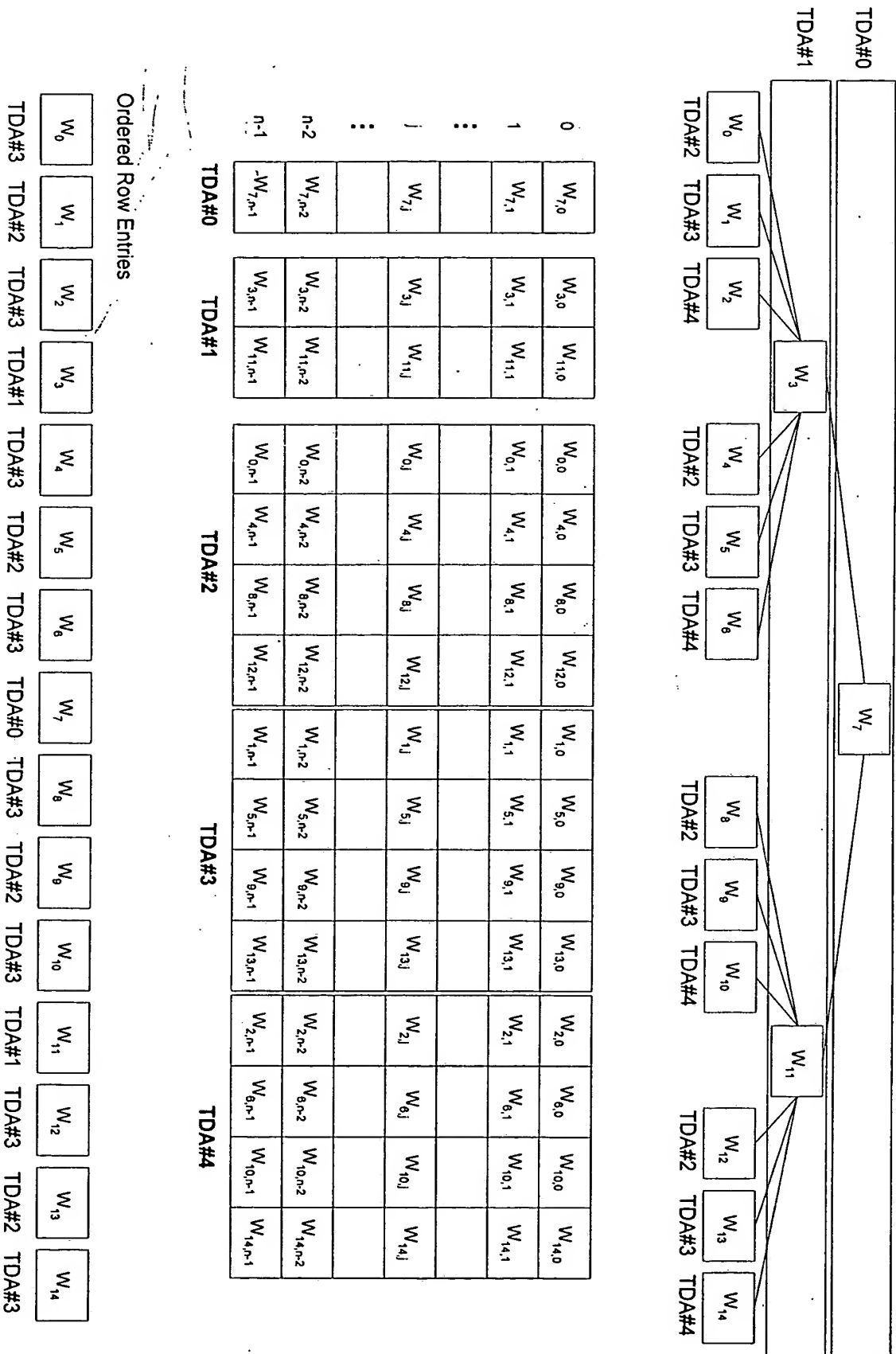


Figure 12

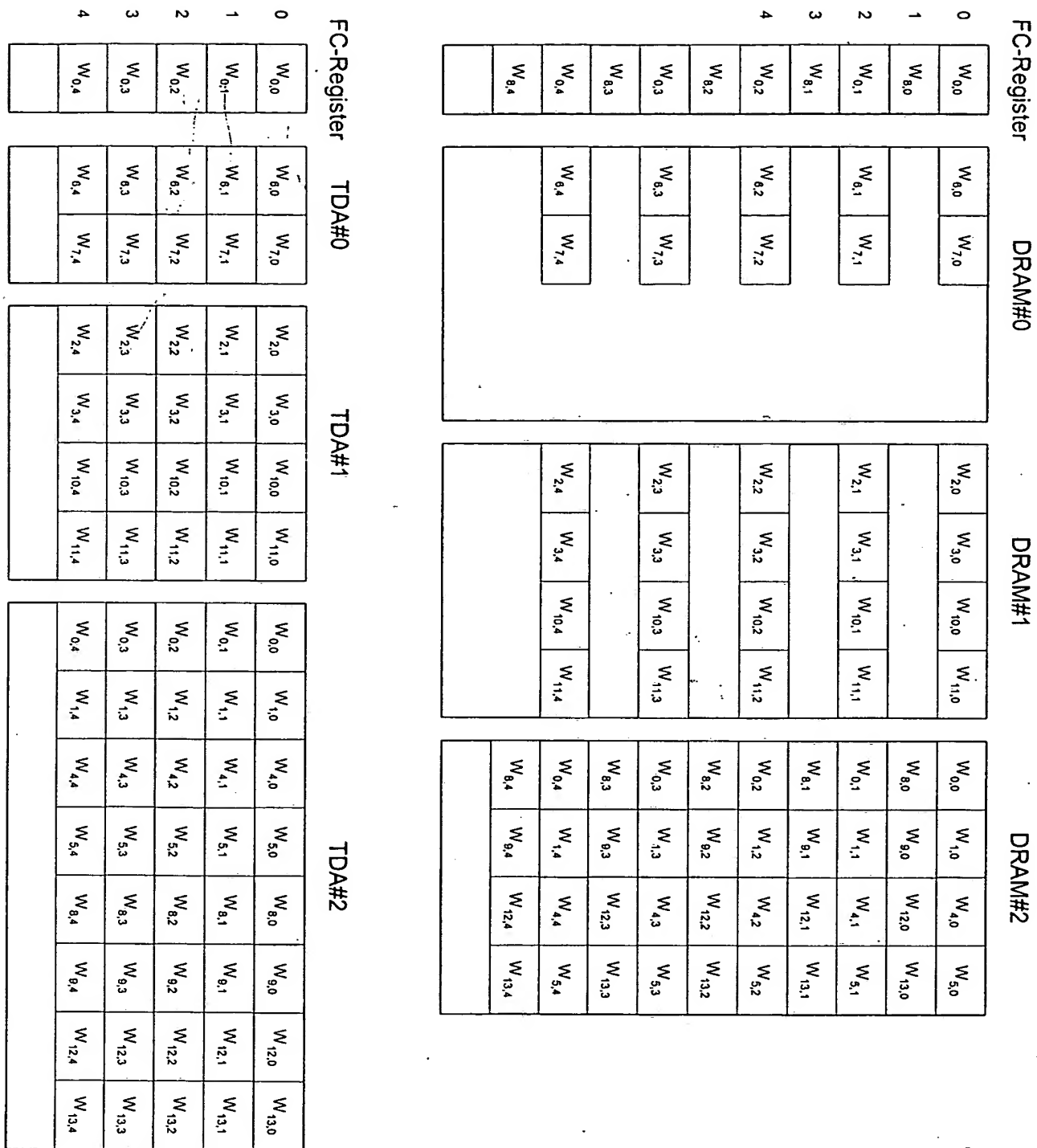


Figure 13

Storage procedure for Binary Search - the entities involved in each stage are stored in separate TDAs

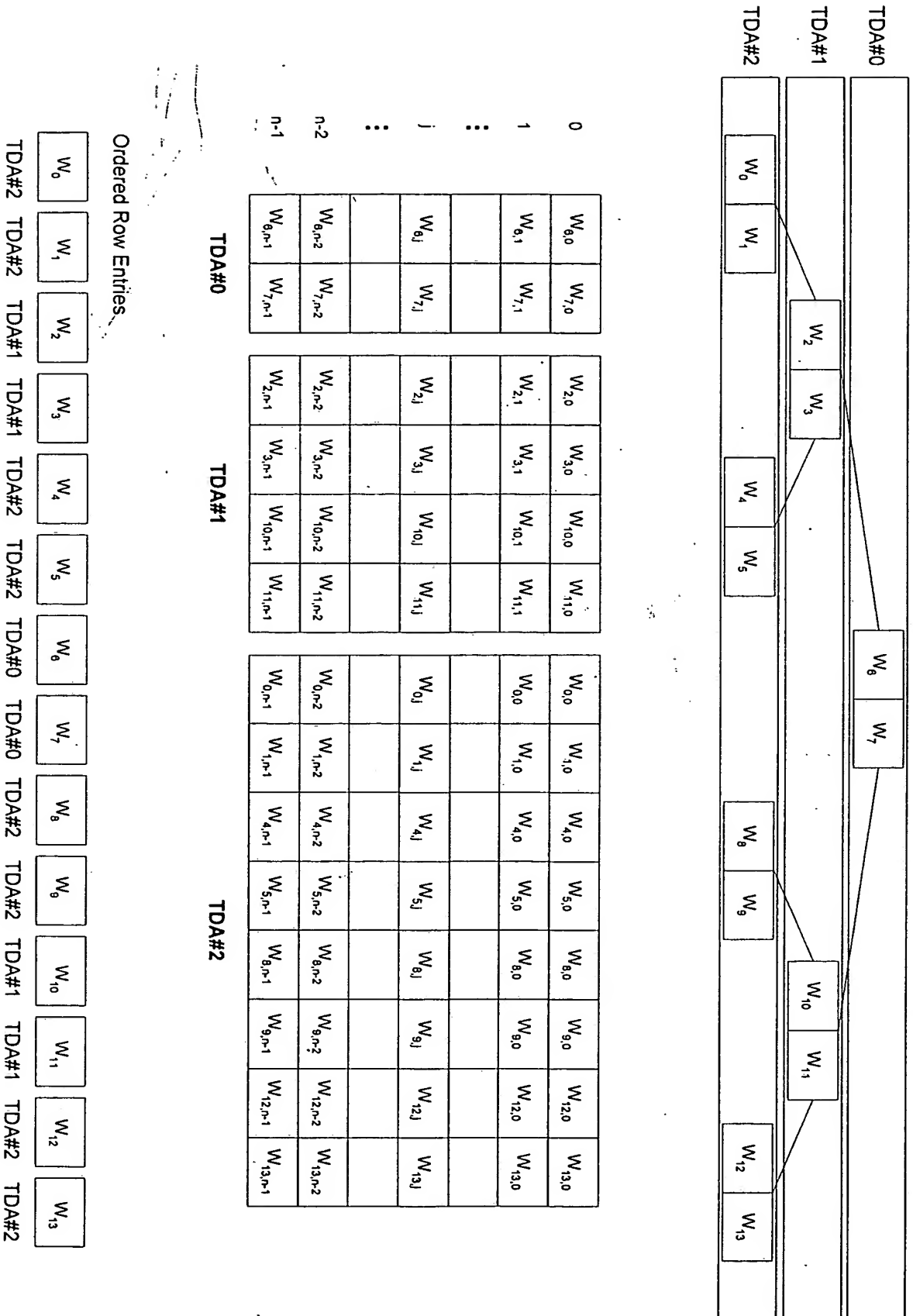


Figure 14

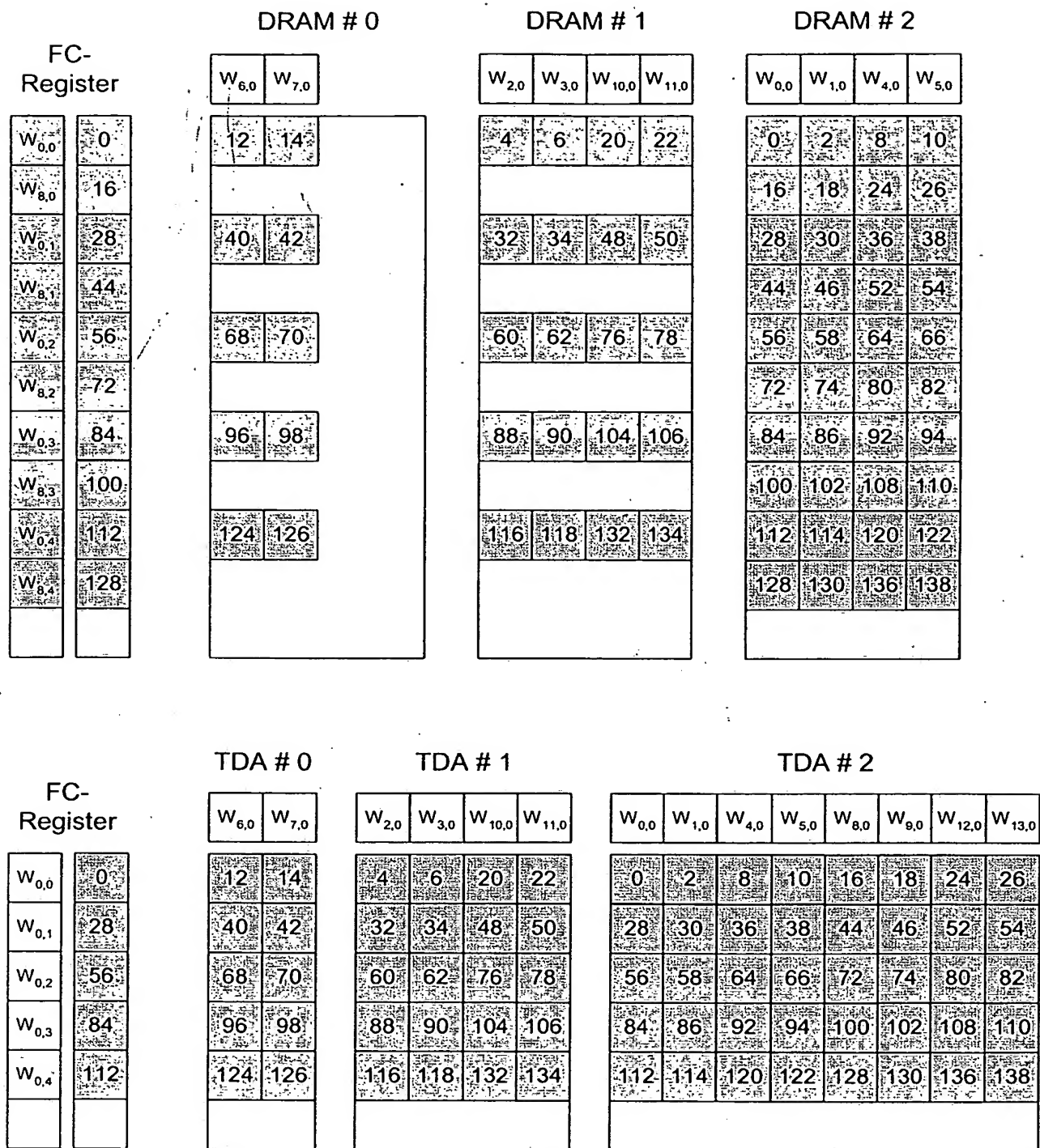


Figure 15

Storage procedure for Binary Search - the entries involved in each stage are stored in separate TDAs

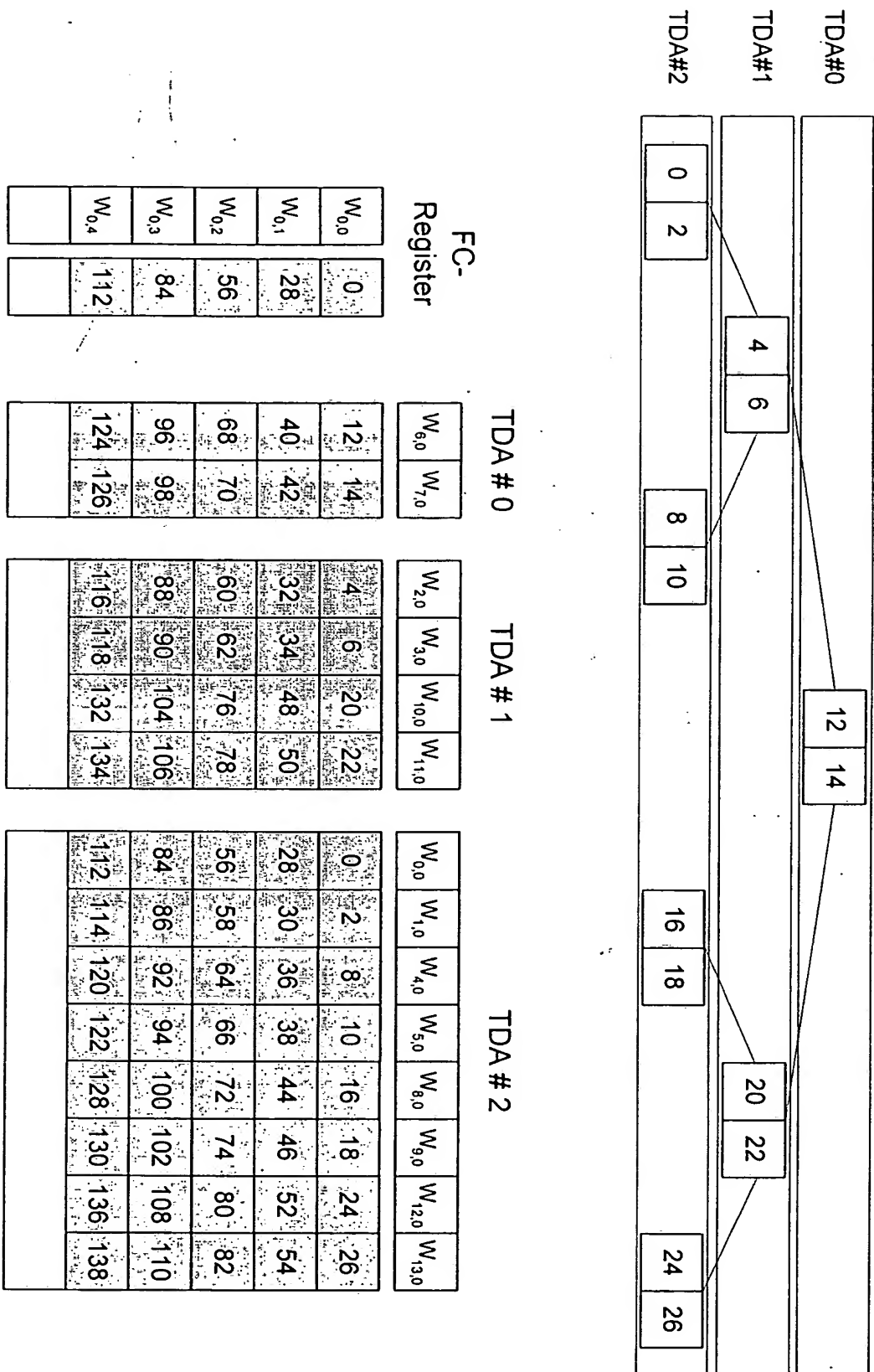
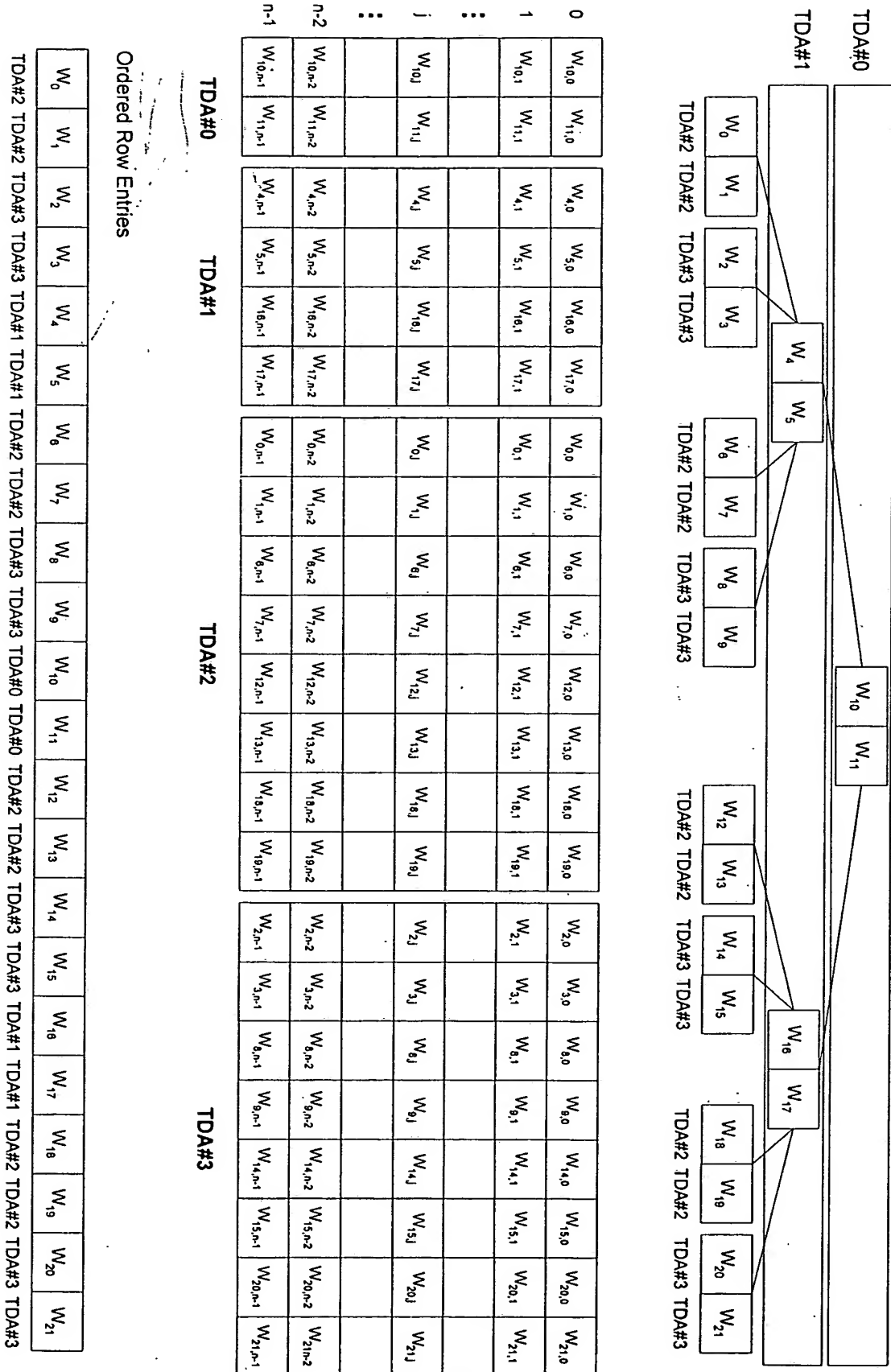


Figure 16

Storage procedure for Binary Search followed by Linear Search - the entries involved in each stage are stored in separate RAMs



Figur 17

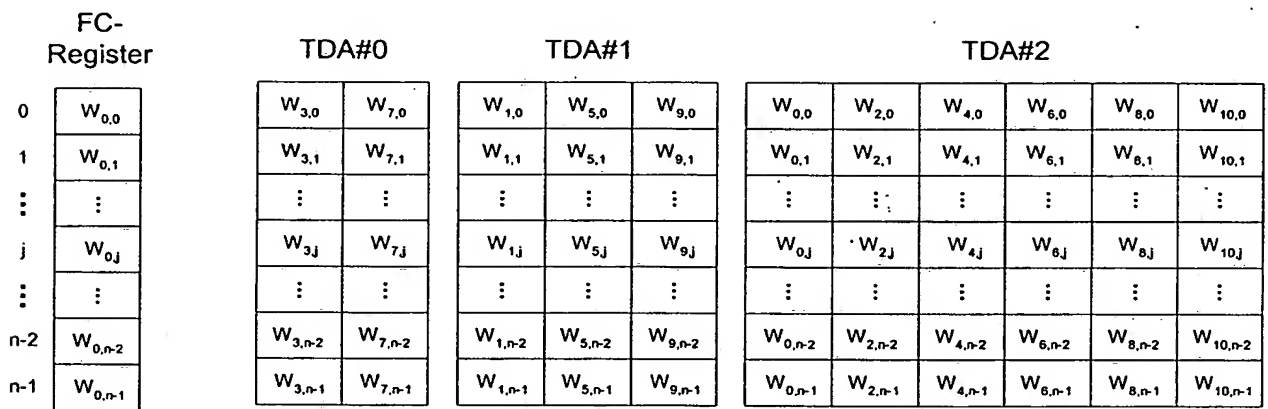
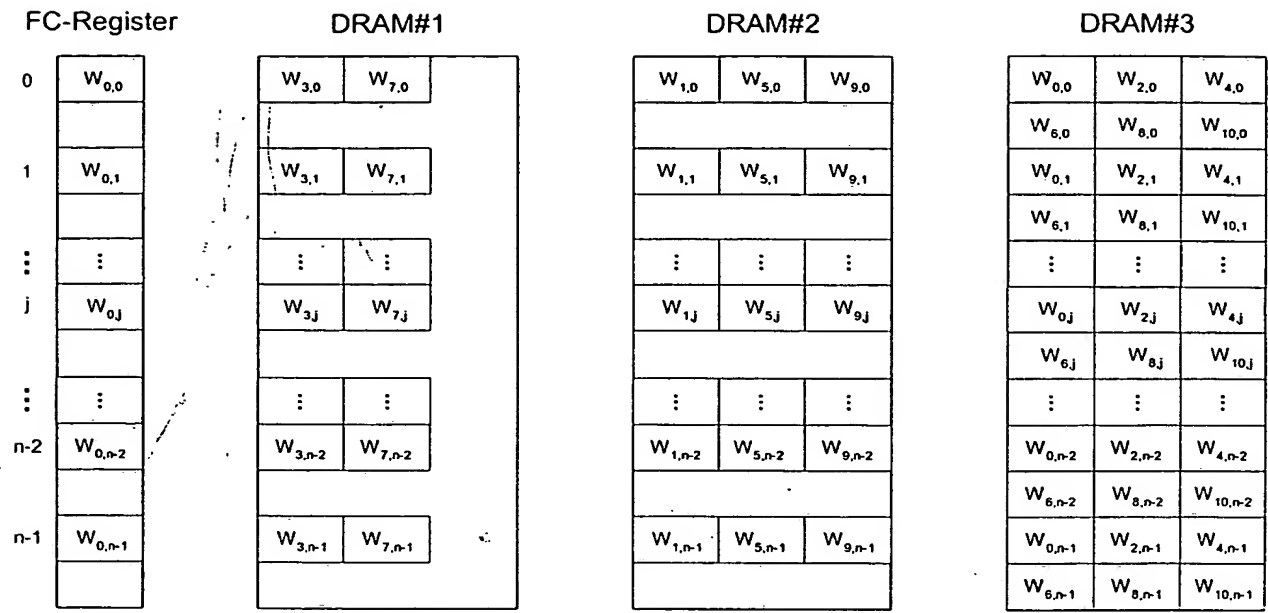
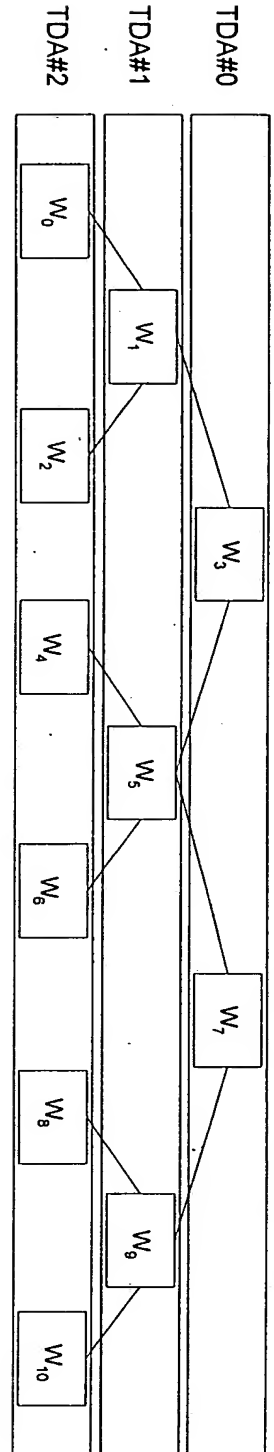


Figure 18

Storage procedure for Ternary Search followed by Binary Search - the entries involved in each stage are stored in separate TDAs



0	$W_{3,0}$	$W_{7,0}$	$W_{1,0}$	$W_{5,0}$	$W_{9,0}$	$W_{0,0}$	$W_{2,0}$	$W_{4,0}$	$W_{6,0}$	$W_{8,0}$	$W_{10,0}$
1	$W_{3,1}$	$W_{7,1}$	$W_{1,1}$	$W_{5,1}$	$W_{9,1}$	$W_{0,1}$	$W_{2,1}$	$W_{4,1}$	$W_{6,1}$	$W_{8,1}$	$W_{10,1}$
\vdots											
j	$W_{3,j}$	$W_{7,j}$	$W_{1,j}$	$W_{5,j}$	$W_{9,j}$	$W_{0,j}$	$W_{2,j}$	$W_{4,j}$	$W_{6,j}$	$W_{8,j}$	$W_{10,j}$
\vdots											
n-2	$W_{3,n-2}$	$W_{7,n-2}$	$W_{1,n-2}$	$W_{5,n-2}$	$W_{9,n-2}$	$W_{0,n-2}$	$W_{2,n-2}$	$W_{4,n-2}$	$W_{6,n-2}$	$W_{8,n-2}$	$W_{10,n-2}$
n-1	$W_{3,n-1}$	$W_{7,n-1}$	$W_{1,n-1}$	$W_{5,n-1}$	$W_{9,n-1}$	$W_{0,n-1}$	$W_{2,n-1}$	$W_{4,n-1}$	$W_{6,n-1}$	$W_{8,n-1}$	$W_{10,n-1}$

TDA#0

TDA#1

TDA#2

Ordered Row Entries

W_0	W_1	W_2	W_3	W_4	W_5	W_6	W_7	W_8	W_9	W_{10}
TDA#2	TDA#1	TDA#2	TDA#0	TDA#2	TDA#1	TDA#2	TDA#0	TDA#2	TDA#1	TDA#2

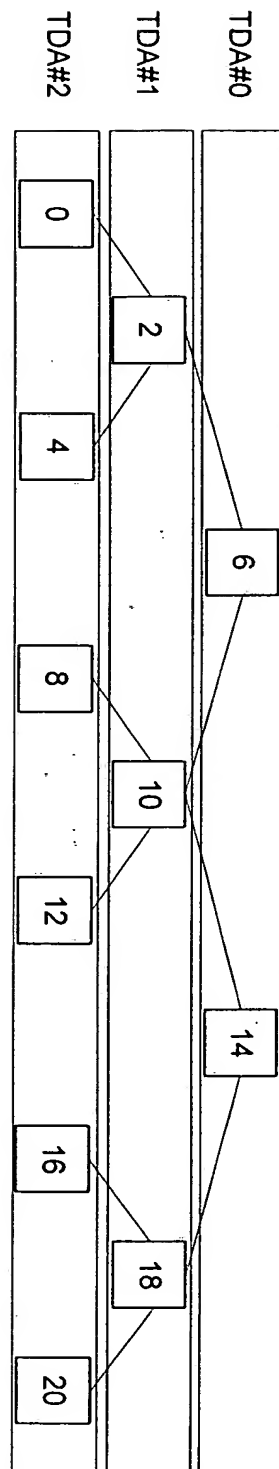
Figure 19

FC-Register		DRAM # 0		DRAM # 1			DRAM # 2		
$W_{0,0}$	0	$W_{3,0}$	$W_{7,0}$	$W_{1,0}$	$W_{5,0}$	$W_{9,0}$	$W_{0,0}$	$W_{2,0}$	$W_{4,0}$
$W_{6,0}$	12	6	14	2	10	18	0	4	8
$W_{0,1}$	22	28	36	24	32	40	12	16	20
$W_{6,1}$	34	50	58	46	54	62	22	26	30
$W_{0,2}$	44	72	80	68	76	84	34	38	42
$W_{6,2}$	56	94	102	90	98	106	44	48	52
$W_{0,3}$	66						56	60	64
$W_{6,3}$	78						66	70	74
$W_{0,4}$	88						78	82	86
$W_{6,4}$	100						88	92	96
							100	104	108

FC-Register		TDA # 0		TDA # 1			TDA # 2					
$W_{0,0}$	0	$W_{3,0}$	$W_{7,0}$	$W_{1,0}$	$W_{5,0}$	$W_{9,0}$	$W_{0,0}$	$W_{2,0}$	$W_{4,0}$	$W_{6,0}$	$W_{8,0}$	$W_{10,0}$
$W_{0,1}$	22	6	14	2	10	18	0	4	8	12	16	20
$W_{0,2}$	44	28	36	24	32	40	22	26	30	34	38	42
$W_{0,3}$	66	50	58	46	54	62	44	48	52	56	60	64
$W_{0,4}$	88	72	80	68	76	84	66	70	74	78	82	86
		94	102	90	98	106	88	92	96	100	104	108

Figure 20

Storage procedure for Ternary Search followed by Binary Search - the entries involved in each stage are stored in separate TDAs



FC-Register		TDA # 0		TDA # 1		TDA # 2	
$W_{0,0}$	0	$W_{3,0}$	$W_{7,0}$	$W_{1,0}$	$W_{5,0}$	$W_{9,0}$	
$W_{0,1}$	22	6	14	2	10	18	
$W_{0,2}$	44	28	36	24	32	40	
$W_{0,3}$	66	50	58	46	54	62	
$W_{0,4}$	88	72	80	68	76	84	
		94	102	90	98	106	

$W_{0,0}$	0	$W_{0,0}$	$W_{2,0}$	$W_{4,0}$	$W_{6,0}$	$W_{8,0}$	$W_{10,0}$
22	4	8	12	16	20		
44	26	30	34	38	42		
66	50	54	58	62	66		
88	74	78	82	86	90		
	98	102	106	110	114		

Figure 21

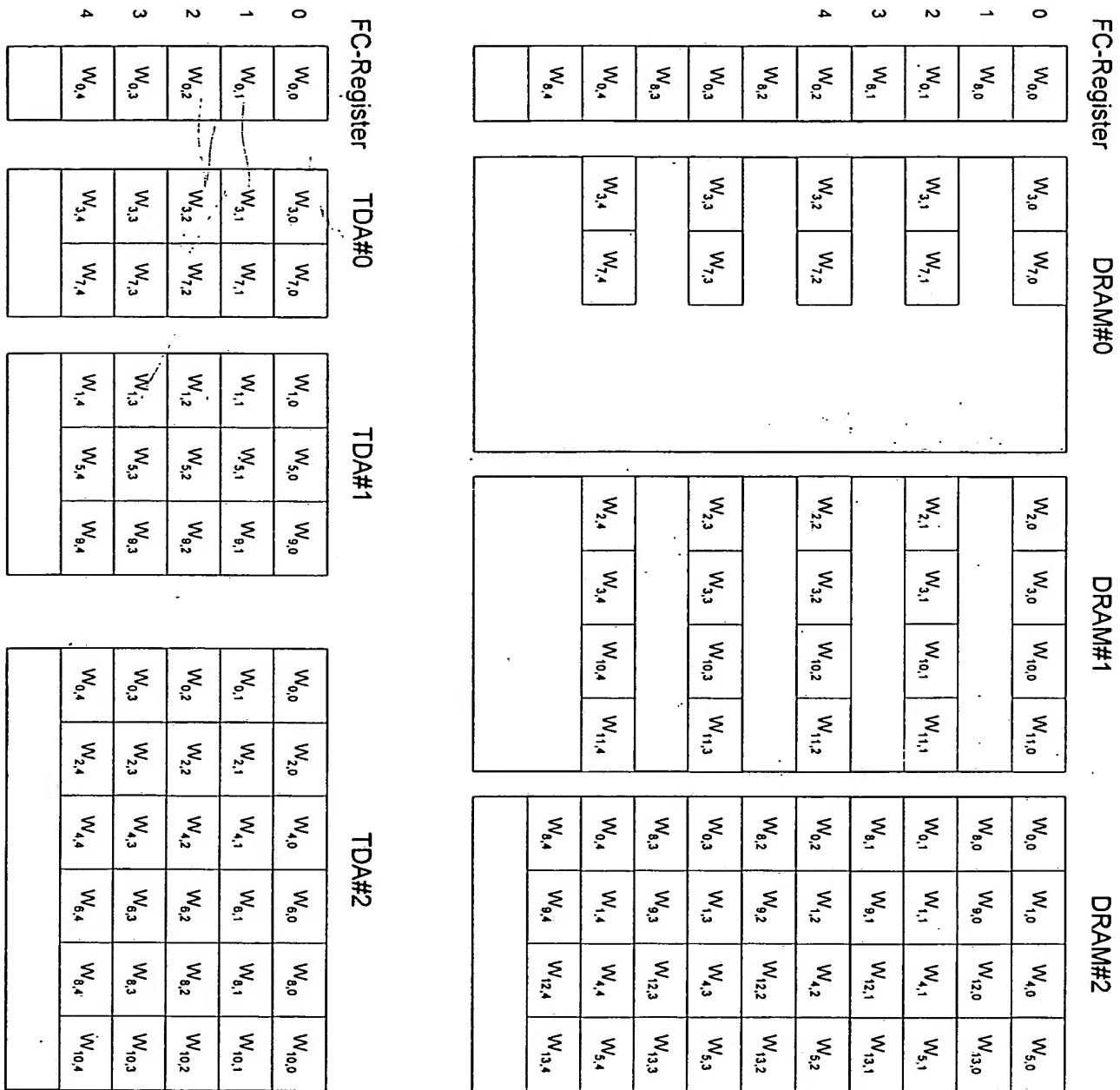
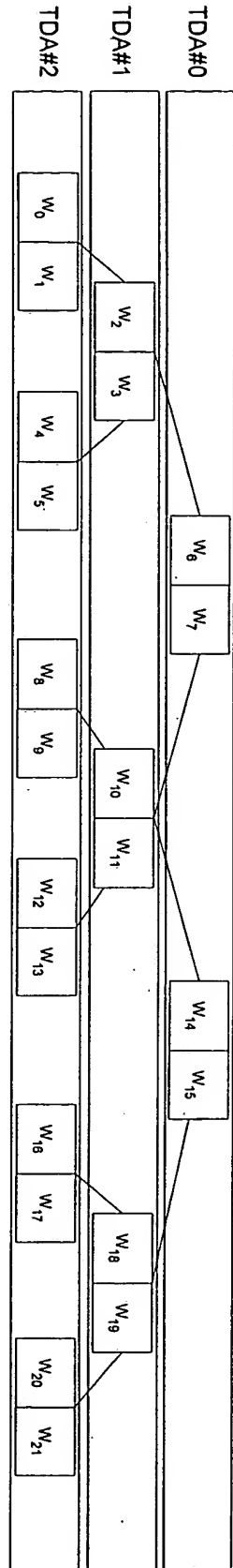


Figure 22

Storage procedure for Ternary Search followed by Binary Search - the entries involved in each stage are stored in separate TDAs



	TDA#0				TDA#1				TDA#2			
0	$W_{6,0}$	$W_{7,0}$	$W_{14,0}$	$W_{15,0}$	$W_{2,0}$	$W_{3,0}$	$W_{10,0}$	$W_{11,0}$	$W_{18,0}$	$W_{19,0}$	$W_{0,0}$	$W_{1,0}$
1	$W_{6,1}$	$W_{7,1}$	$W_{14,1}$	$W_{15,1}$	$W_{2,1}$	$W_{3,1}$	$W_{10,1}$	$W_{11,1}$	$W_{18,1}$	$W_{19,1}$	$W_{0,1}$	$W_{1,1}$
:												
j	$W_{6,j}$	$W_{7,j}$	$W_{14,j}$	$W_{15,j}$	$W_{2,j}$	$W_{3,j}$	$W_{10,j}$	$W_{11,j}$	$W_{18,j}$	$W_{19,j}$	$W_{0,j}$	$W_{1,j}$
:												
n-2	$W_{6,n-2}$	$W_{7,n-2}$	$W_{14,n-2}$	$W_{15,n-2}$	$W_{2,n-2}$	$W_{3,n-2}$	$W_{10,n-2}$	$W_{11,n-2}$	$W_{18,n-2}$	$W_{19,n-2}$	$W_{0,n-2}$	$W_{1,n-2}$
n-1	$W_{6,n-1}$	$W_{7,n-1}$	$W_{14,n-1}$	$W_{15,n-1}$	$W_{2,n-1}$	$W_{3,n-1}$	$W_{10,n-1}$	$W_{11,n-1}$	$W_{18,n-1}$	$W_{19,n-1}$	$W_{0,n-1}$	$W_{1,n-1}$

Ordered RowEntries

	W_0	W_1	W_2	W_3	W_4	W_5	W_6	W_7	W_8	W_9	W_{10}	W_{11}	W_{12}	W_{13}	W_{14}	W_{15}	W_{16}	W_{17}	W_{18}	W_{19}	W_{20}	W_{21}
TDA#2																						
TDA#2																						
TDA#1																						
TDA#2																						
TDA#0																						
TDA#0																						
TDA#2																						
TDA#2																						
TDA#1																						
TDA#0																						
TDA#2																						
TDA#1																						
TDA#0																						
TDA#2																						
TDA#2																						

Figure 23

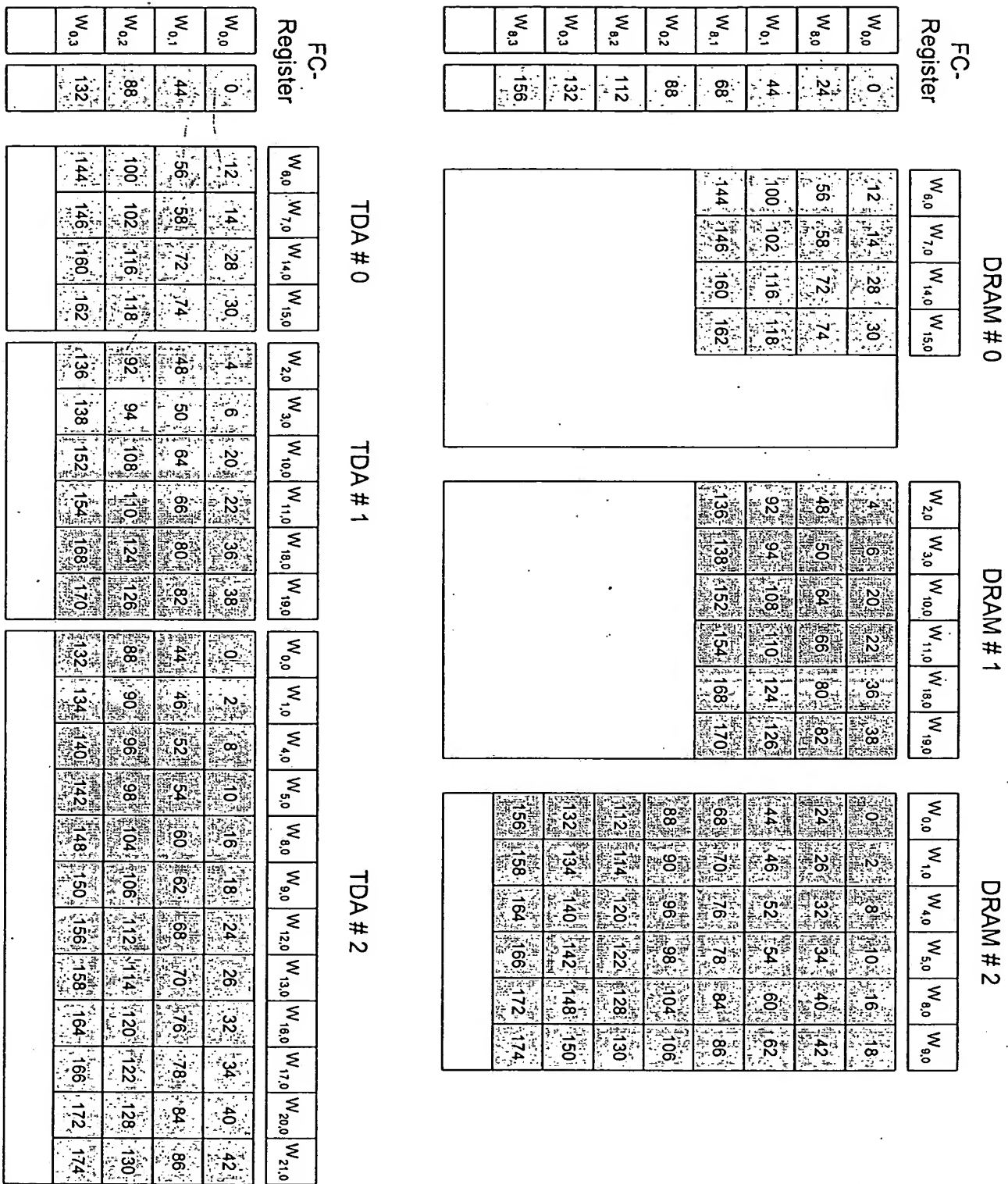
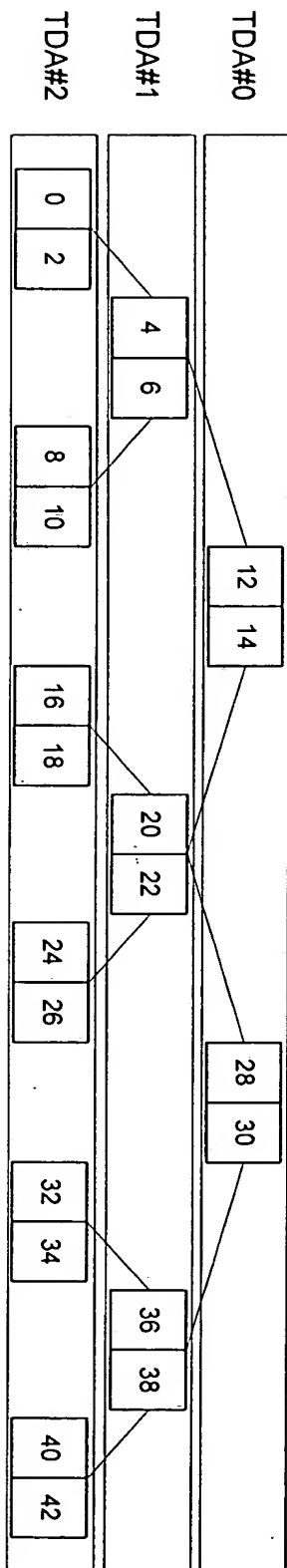


Figure 24

Storage procedure for Ternary Search followed by Binary Search - the entries involved in each stage are stored in separate TDAs



FC-

Register

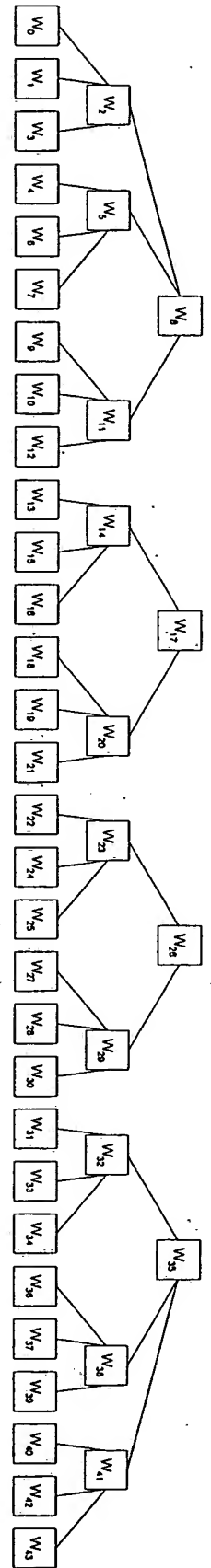
TDA # 0

TDA # 1

TDA # 2

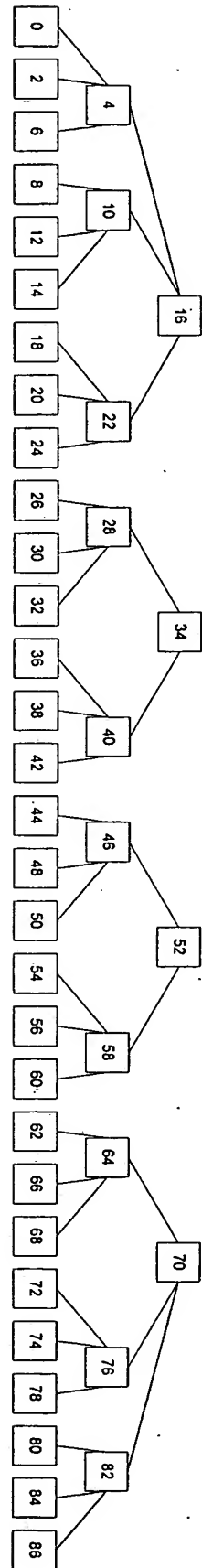
$W_{0,0}$	0	12	14	28	30	4	6	20	22	36	38	0	2	8	10	16	18	24	26	32	34	40	42
$W_{0,1}$	44	56	58	72	74	48	50	64	66	80	82	44	46	52	54	60	62	68	70	76	78	84	86
$W_{0,2}$	88	100	102	116	118	92	94	108	110	124	126	88	90	96	98	104	106	112	114	120	122	128	130
$W_{0,3}$	132	144	146	160	162	136	138	152	154	168	170	132	134	140	142	148	150	156	158	164	166	172	174

Figure 25



0	$W_{0,0}$	$W_{1,0}$	$W_{2,0}$	$W_{3,0}$	$W_{4,0}$	$W_{5,0}$	$W_{6,0}$	$W_{7,0}$	$W_{8,0}$	$W_{9,0}$	$W_{10,0}$	$W_{11,0}$	$W_{12,0}$	$W_{13,0}$	$W_{14,0}$	$W_{15,0}$	$W_{16,0}$	$W_{17,0}$	$W_{18,0}$	$W_{19,0}$	$W_{20,0}$	$W_{21,0}$	$W_{22,0}$	$W_{23,0}$	$W_{24,0}$	$W_{25,0}$	$W_{26,0}$	$W_{27,0}$	$W_{28,0}$	$W_{29,0}$	$W_{30,0}$	$W_{31,0}$	$W_{32,0}$	
1			$W_{20,0}$	$W_{25,0}$		$W_{11,0}$	$W_{4,0}$		$W_{20,0}$	$W_{25,0}$		$W_{11,0}$	$W_{4,0}$		$W_{20,0}$	$W_{25,0}$		$W_{11,0}$	$W_{4,0}$		$W_{20,0}$	$W_{25,0}$		$W_{11,0}$	$W_{4,0}$		$W_{20,0}$	$W_{25,0}$		$W_{11,0}$	$W_{4,0}$		$W_{20,0}$	$W_{25,0}$
2	$W_{0,0}$	$W_{1,0}$	$W_{2,0}$	$W_{3,0}$	$W_{4,0}$	$W_{5,0}$	$W_{6,0}$	$W_{7,0}$	$W_{8,0}$	$W_{9,0}$	$W_{10,0}$	$W_{11,0}$	$W_{12,0}$	$W_{13,0}$	$W_{14,0}$	$W_{15,0}$	$W_{16,0}$	$W_{17,0}$	$W_{18,0}$	$W_{19,0}$	$W_{20,0}$	$W_{21,0}$	$W_{22,0}$	$W_{23,0}$	$W_{24,0}$	$W_{25,0}$	$W_{26,0}$	$W_{27,0}$	$W_{28,0}$	$W_{29,0}$	$W_{30,0}$	$W_{31,0}$	$W_{32,0}$	
3	$W_{3,0}$	$W_{4,0}$	$W_{18,0}$	$W_{19,0}$	$W_{21,0}$	$W_{22,0}$	$W_{24,0}$	$W_{25,0}$	$W_{27,0}$	$W_{28,0}$																								
4	$W_{6,0}$	$W_{7,0}$	$W_{21,0}$	$W_{22,0}$	$W_{24,0}$	$W_{25,0}$	$W_{27,0}$	$W_{28,0}$																										
5	$W_{9,0}$	$W_{10,0}$	$W_{24,0}$	$W_{25,0}$	$W_{27,0}$	$W_{28,0}$																												
6	$W_{12,0}$	$W_{13,0}$	$W_{27,0}$	$W_{28,0}$																														
7	$W_{6,1}$	$W_{7,1}$	$W_{0,1}$	$W_{1,1}$	$W_{20,1}$	$W_{21,1}$	$W_{22,1}$	$W_{23,1}$	$W_{24,1}$	$W_{25,1}$																								
8			$W_{20,1}$	$W_{21,1}$																														
9	$W_{0,1}$	$W_{1,1}$	$W_{15,1}$	$W_{16,1}$	$W_{21,1}$	$W_{22,1}$	$W_{24,1}$	$W_{25,1}$	$W_{27,1}$	$W_{28,1}$																								
10	$W_{3,1}$	$W_{4,1}$	$W_{18,1}$	$W_{19,1}$	$W_{21,1}$	$W_{22,1}$	$W_{24,1}$	$W_{25,1}$	$W_{27,1}$	$W_{28,1}$																								
11	$W_{6,1}$	$W_{7,1}$	$W_{21,1}$	$W_{22,1}$	$W_{24,1}$	$W_{25,1}$	$W_{27,1}$	$W_{28,1}$																										
12	$W_{9,1}$	$W_{10,1}$	$W_{24,1}$	$W_{25,1}$	$W_{27,1}$	$W_{28,1}$																												
13	$W_{12,1}$	$W_{13,1}$	$W_{27,1}$	$W_{28,1}$																														
14	$W_{6,2}$	$W_{7,2}$	$W_{0,2}$	$W_{1,2}$	$W_{20,2}$	$W_{21,2}$	$W_{22,2}$	$W_{23,2}$	$W_{24,2}$	$W_{25,2}$																								
:	:	:	:	:	:	:	:	:	:	:																								
TDA#0	:	:	:	:	:	:	:	:	:	:																								
TDA#1	:	:	:	:	:	:	:	:	:	:																								
TDA#2	:	:	:	:	:	:	:	:	:	:																								
TDA#3	:	:	:	:	:	:	:	:	:	:																								

Figure 26



0	16	34	16	34	52	70	4	10
1			52	70			22	28
2	0	2	30	32	60	62	40	46
3	6	8	36	38	66	68	58	64
4	12	14	42	44	72	74	76	82
5	18	20	48	50	78	80		
6	24	26	54	56	84	86		
7	104	122	104	122	140	152	92	98
8			140	152			110	116
9	88	90	118	120	148	150	128	134
:	:	:	:	:	:	:	:	:

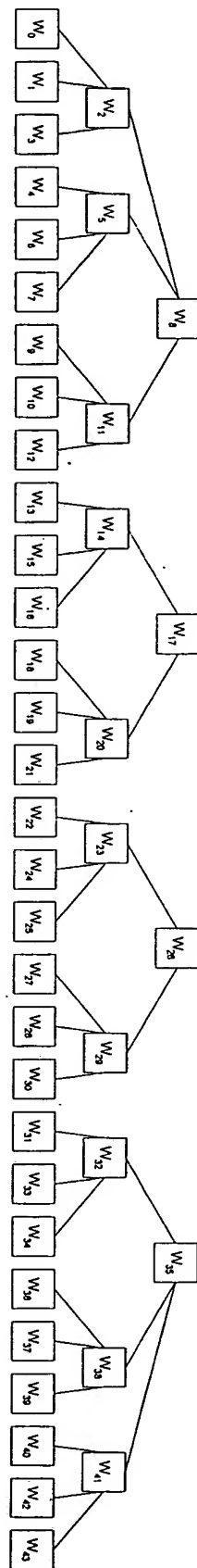
TDA#0

TDA#1

TDA#2

TDA#3

Figure 27



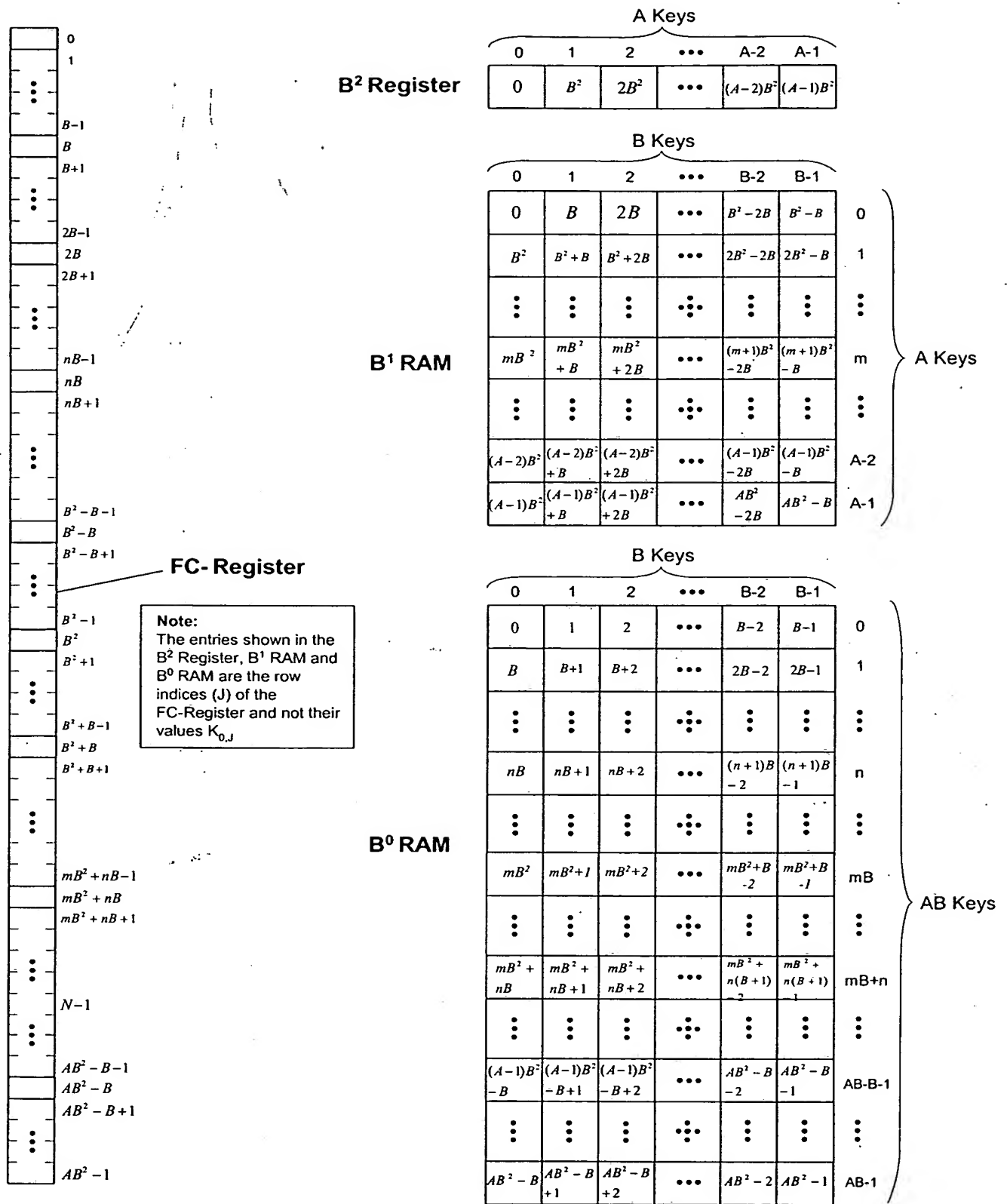
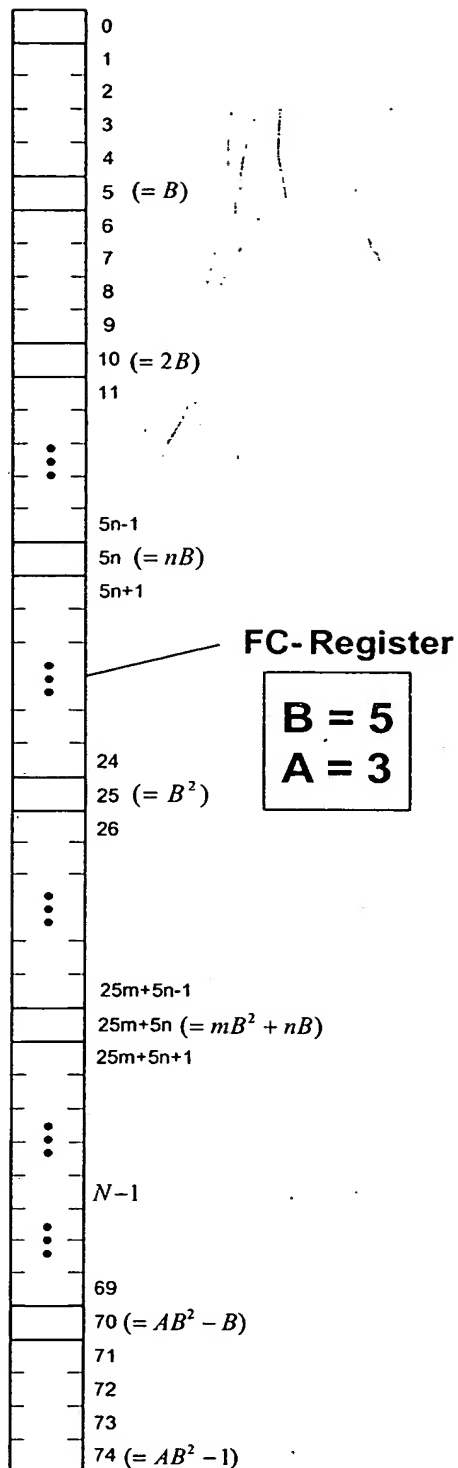


Figure 29



Note:

The entries shown in the B^2 Register, B^1 RAM and B^0 RAM are the row indices (J) of the FC-Register and not their values $K_{0,J}$.

B^2 Register

3 Keys		
0	1	2
0	25	50

B^1 RAM

Row #	5 Keys				
	0	1	2	3	4
0	0	5	10	15	20
1	25	30	35	40	45
2	50	55	60	65	70

B^0 RAM

Row #	5 Keys				
	0	1	2	3	4
0	0	1	2	3	4
1	5	6	7	8	9
2	10	11	12	13	14
3	15	16	17	18	19
4	20	21	22	23	24
5	25	26	27	28	29
6	30	31	32	33	34
7	35	36	37	38	39
8	40	41	42	43	44
9	45	46	47	48	49
10	50	51	52	53	54
11	55	56	57	58	59
12	60	61	62	63	64
13	65	66	67	68	69
14	70	71	72	73	74

Figure 30